Claims:

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1. A receiver responsive to an n_o plurality of antennas comprising:

a pre-filter having an $n_o \times n_i$ plurality of FIR filters, each responsive to a signal that is derived from one of said n_o antennas and applied to an input point, and each developing an output signal that contributes to one of n_i pre-filter outputs; and

decision logic responsive to said n_i outputs.

2. The receiver of claim **1** further comprising a sampling circuit interposed between said n_o plurality of antennas and said pre-*filter that samples received signal at rate* $T_s = \frac{T}{l}$, *where l is an integer and* T is symbol rate of a transmitter whose signals said receiver receives.

3. The receiver of claim **2** where l>1.

4. The receiver of claim **1** where coefficients of said FIR filters are computed in a processor in response to a block of N_f symbols.

5. The receiver of claim **4** where said processor is part of said pre-filter.

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6. The receiver of claim **4** where said coefficients of said FIR filters are computed once every time interval during which transfer characteristics of said transmission channel, **H**, are substantially constant.

7. The receiver of claim **6** where said processor installs computed coefficients of said FIR filters in said FIR filters following each computation.

8. The receiver of claim **1** where said FIR filters form an array of filters, and said array has one FIR filter connected between each of said n_o input points and said n_i outputs.

9. The receiver of claim **8** where said n_o plurality of antennas receive signals, via said transmission channel, from a transmitter having a multiple number of transmitting antennas.

10. The receiver of claim **9** where said transmitter has n_i transmitting antennas.

11. The receiver of claim **10** wherein said decision logic is adapted to receive from said transmitted signals that were encoded in a space-time encoding schema.

12. The receiver of claim **2** where said plurality of FIR filters is expressed by matrix **W**, and **W** is computed by $\mathbf{W}^{*}_{opt} = \tilde{\mathbf{B}}^{*}_{opt}\mathbf{R}_{xy}\mathbf{R}^{-1}_{yy}$, $\mathbf{W}^{*}_{opt} = \tilde{\mathbf{B}}^{*}_{opt}\mathbf{R}_{xx}\mathbf{H}^{*}(\mathbf{H}\mathbf{R}_{xx}\mathbf{H}^{*} + \mathbf{R}_{nn})^{-1}$, or $\mathbf{W}^{*}_{opt} = \tilde{\mathbf{B}}^{*}_{opt}(\mathbf{R}^{-1}_{xx} + \mathbf{H}^{*}\mathbf{R}^{-1}_{nn}H)^{-1}\mathbf{H}^{*}\mathbf{R}^{-1}_{nn}$, where $\mathbf{R}_{xx}$ is an autocorrelation matrix of a block of signals transmitted by a plurality of transmitting antennas to said n_o antennas via a channel having a transfer characteristic **H**, $\mathbf{R}_{nn}$ is an autocorrelation matrix of noise received by said plurality of n_o antennas during said block of signals transmitted by said transmitting antennas, $\mathbf{R}_{xy} = \mathbf{R}_{xx}\mathbf{H}^{*}$, $\mathbf{R}_{yy} = \mathbf{H}\mathbf{R}_{xx}\mathbf{H}^{*} + \mathbf{R}_{nn}$, and $\tilde{\mathbf{B}}^{*}_{opt}$ is a sub-matrix of matrix $\mathbf{B}^{*}_{opt}$, where $\mathbf{B}_{opt} = \arg\min_{B} trace(\mathbf{R}_{ee})$ subject to a selected constraint, $\mathbf{R}_{ee}$ being the error autocorrelation function.

13. The receiver of claim **12** wherein said plurality of FIR filters are subjected to designer constraints relative to any one or a number of members of the following set: transmission channel memory, size of said block, effective memory of the combination consisting of said transmission channel and said pre-

filter; n_i, n_o, autocorrelation matrix $\mathbf{R}_{xx}$, autocorrelation matrix $\mathbf{R}_{nn}$, value of factor l in said sampling circuit, and decision delay.

14. The receiver where said matrix **W** is expressible by $\mathbf{W} \equiv \begin{bmatrix} \mathbf{W}_0 & \mathbf{W}_1 & \cdots & \mathbf{W}_{N_f-1} \end{bmatrix}^t$, where matrix $\mathbf{W}_q$ is a matrix that specifies qth tap coefficients of said FIR filters.

15. The receiver of claim **12** where said constraint restricts **B** so that $\mathbf{B}^*\mathbf{\Phi} = \mathbf{I}_{n_i}$, where $\mathbf{\Phi}^* \equiv \begin{bmatrix} \mathbf{0}_{n_i \times n_i m} & \mathbf{I}_{n_i} & \mathbf{0}_{n_i \times n_i (N_b - m)} \end{bmatrix}$ and m is a selected constant.

16. The receiver of claim **15** where $\mathbf{B} = \bar{\mathbf{R}}^{-1}\mathbf{\Phi}(\mathbf{\Phi}^*\bar{\mathbf{R}}^{-1}\mathbf{\Phi})^{-1}$, $\bar{\mathbf{R}}$ is a sub-matrix of a matrix $\mathbf{R}^{\perp} = \mathbf{R}_{xx} - \mathbf{R}_{xy}\mathbf{R}_{yy}^{-1}\mathbf{R}_{yx}$.

17. The receiver of claim **12** where said constraint restrict **B** so that $\mathbf{B}^*\mathbf{B} = \mathbf{I}_{n_i}$.

18. The receiver of claim **17** where $\mathbf{B} = \mathbf{U}\begin{bmatrix} e_{n_i N_b} & \cdots & e_{n_i(N_b+1)-1} \end{bmatrix}$, each element e_p is a vector having a 0 element in all rows other than row p, at which row the element is 1, and U is a matrix that satisfies the equation $\bar{\mathbf{R}} \equiv \mathbf{U\Sigma U}^*$, $\mathbf{\Sigma}$ being a diagonal matrix.